REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Replacement Sheets for Figs. 1-8 are attached with a Submission of Proposed Drawing Amendments, providing these figures with labels as "prior art" as required in Section 3 of the office action.

An Information Disclosure Statement is submitted concurrently herewith, as discussed below.

New claims 79-119 are filed in order to clarify and emphasize patentable aspects of this invention.

Concerning the objection, in the paragraph bridging pages 2 and 3 of the office action, to previous claims 77 and 78 directed to a computer-readable storage medium, new claims 118 and 119 are believed to overcome this objection.

Claims 37-78 were rejected under 35 USC 103(a) as unpatentable over NEC's 3GPP contribution "Per-Cell, Per-UE, Per-MAC-d Flow Basis Scheduling Signaling in Enhanced Uplink" (R2-041294) in view of USPN 7,023,825 (Haumont et al.). To the extent that these rejections may be deemed applicable to new claims 79-119 presented herein, the Applicants respectfully traverse, based on the points set forth below.

The subject matter of new independent claim 79 is based on original independent claim 1 and previous claim 17. New claim 79 recites, *inter alia*, that QoS information of a plurality of flows, that are to be multiplexed onto a single dedicated uplink channel by a mobile terminal, is received at the base station from a radio network controller. Claim 79 further recites that the scheduling request comprises an identifier identifying one of the plurality of flows.

Similar features are incorporated in new independent claims 100, 114 and 116.

It is submitted that this subject matter is not rendered obvious by the individual or combined teachings of the applied art.

R2-041294 by NEC discusses three different types of scheduling and the related signaling for Enhanced Uplink, namely, Per-Cell, Per-UE and Per MAC-d flow scheduling (see section 2 of the document).

As one of ordinary skill in the art would recognize from Fig. 4 of R2-041294, in the "Per MAC-d flow" scheduling approach of R2-041294, there are *n* separate control loops, one control loop per MAC-d flow. Hence, for each MAC-d flow, there is a separate rate request and rate grant.

On the other hand, for the "Per UE" scheduling approach, a single control loop is provided per UE (see section 3, second paragraph).

The approach referred to in the office action appears to be the "Per MAC-d flow" scheduling approach suggested in R2-041294, which is in distinct contrast to the scheduling approach of the present claimed invention. The present claimed invention relates to per-UE scheduling (i.e. per-mobile terminal scheduling) providing a per-flow QoS differentiation in scheduling. Thus, the present claimed invention should be compared and contrasted with the "per-UE" single control loop scheduling approach discussed in R2-041294.

In the "Per MAC-d flow" scheduling approach suggested in R2-041294, there is a single bit rate request (RR) in the uplink (see the last sentence prior to Fig. 4 of the document). In contrast to the subject matter of independent claim 79, this single-bit rate request necessarily may not comprise a flow identifier.

A MAC-d flow identification by means of a single-bit rate request is possible, as R2-041294 assumes the rate scheduling scheme proposed in the document TSG RAN WG1 Tdoc. R1-031201, which is referenced as document in [3] in R2-041294 and a figure of which is shown in Appendix 6 of R2-041294. A copy of this document is provided in the Information disclosure Statement filed herewith.

As is apparent from the first paragraph of chapter 2 of R1-031201, the basic assumption of the scheduling system discussed in R1-031201 (and in R2-041294) is the controlling of the transmit format combinations (TFCs) in a stepwise manner (i.e., by UP, DOWN and KEEP commands), i.e., by incrementing/decrementing a pointer to the respective TFCs.

However, in this scenario, the ordering of the different transport format combination subsets is not a trivial task in case plural transport channels are multiplexed together. The solution proposed in R2-041294 and the referenced document R1-031201 is based on the assumption of a TDM scheme, which allows for an implicit identification of individual flows. Each TDM signaling frame is assigned to a specific flow so that, by means of the single-bit rate request (RR) mentioned in R2-041294 and the relative position of the rate request bit in the TDM structure, resources may be requested from the scheduling entity on a per-flow basis.

The rate requests in R2-041294 in the per-MAC-d flow technique are thus transmitted for individual flows, without needing an explicit indication of the respective flow.

Accordingly, R2-041294 clearly fails to teach or suggest a scheduling request comprising a flow identifier identifying one of a plurality of flows to be multiplexed onto a single dedicated uplink channel, and the flow identifier identifying Quality of Service (QoS) information related to the identified flow.

Furthermore, there is also nothing in R2-041294 that teaches receiving Quality of Service (QoS) information of a plurality of flows to be multiplexed onto a single dedicated uplink channel by a mobile terminal at the base station from a radio network controller.

Concerning the issue of obviousness, it should be noted that the main advantage of the system described in R2-041294 is to allow for a differentiation of the MAC-d flows in the scheduler (due to the rate request being sent on a per-flow basis) while reducing the signaling overhead for the rate requests to one single bit, which is an important issue considering that rate requests are typically sent each TCI so that every additional bit for the rate request results in a tremendous additional control signaling overhead.

In view of these two main aspects of the system design of R2-041294, those skilled in the art would not have been motivated to further develop the system of R2-041294 by introducing an explicit identification of individual flows by means of an explicit flow identifier in the scheduling request as proposed by the present claimed invention, as this would unnecessarily increase the signaling overhead, which has been avoided in R2-041294 by the utilization of a TDM structure and a single-bit rate request.

The use of an explicit flow identification in the scheduling request according to the present claimed invention is nevertheless advantageous in the context of the system design supposed by the invention, namely, a "per-UE" scheduling utilizing a single control loop per UE (mobile terminal). Concerning this scheduling approach, R2-041294 offers no solution as can be seen from section 4, second bullet point, of the enumeration.

Furthermore, the Applicants respectfully note that the statements in Sections 4 and 7 on pages 7 and 8 of the Office Action appear incorrect.

Concerning Section 4, it is noted that MAC-d flows are not identical to logical channels (see claims 80 and 101), but rather the logical channels provide data packets from the RLC layer to the MAC layer which is mapping the data packets of the logical channels to the appropriate transport channels (that are passed to the Physical layer). As can be seen in Figs. 4 and 5 of the present application, the MAC-d entity processes the logical channel data and outputs MAC-d flows passed to the MAC-e entity.

Concerning Section 7, section 9 in R2-041294 (actually section 8 of the document, including a proposal for section 9 of TS 25.309) distinguishes two different scheduling modes. However, this bears no relation to QoS information comprising a transmission mode.

From the above discussion, it is apparent that R2-041294 bears several deficiencies *vis-à-vis* the present claimed invention. It is submitted that USPN 7,023,825 does not cure the above-noted deficiencies of R2-041294.

USPN 7,023,825 discloses a method for supporting a more advanced QoS scheme providing more flexibility in a UMTS-based system as for example depicted in Fig. 1. The main idea appears to be to allow setting different QoS profiles for different applications in the PDP context that are using the same IP address. Essentially, each application is associated with a QoS profile comprised of certain QoS parameters such as delay requirements (see for example col. 7, lines 2 to 7 and lines 17 to 34).

In order to differentiate packets belonging to different applications and QoS profiles, each data packet is provided a flow/profile tag indicating the profile to which the packets relate. The QoS defines how the packets are handled during the transmission through the GPRS network, e.g., controlling the order of transmission, buffering and discarding of PDUs in SGNS and

GGSN (see for example col. 8, line 40 to col. 9, line 8; col. 13, lines 3 to 32 also referred to in the office action).

Essentially, USPN 7,023,825 does not teach any radio level (radio resource) scheduling and the required control signaling. The reference mentions only "scheduling" in the edge nodes of the network (SGSN,GGSN) - see for example col. 15, lines 24 to 32,. col. 16, lines 53 to 50). The "scheduling" mentioned in USPN 7,023,825 appears to be related to routing and traffic policing based on the profile tags in the packet headers , i.e., network interface (wired interface) scheduling (see, for example, the scheduling and policing mechanism described in column 10 lines 6-24) rather than a radio resource scheduling as in the present independent claims.

Accordingly, in USPN 7,023,825, the base station appears not to participate in the scheduling. There is no explicit teaching in USPN 7,023,825 that the base station is even aware of QoS profiles.

Rather, the figures of USPN 7,023,825 (in particular Fig. 2 and Fig. 4) appear to indicate that the base stations are not likely to be provided with the different QoS profiles in order to enable QoS-aware scheduling, as the improvements suggested in USPN 7,023,825 appear related to the upper protocol layers of SNDCP/GTP which are transparent to the base stations according to the protocol stack shown in Fig. 2.

Thus, it is submitted that the two applied references fail to teach or suggest the subject matter of new claims 79-119. Furthermore, as the solution discussed in USPN 7,023,825 relates to a completely different layer in the protocol stack and in view of the solution proposed in USPN 7,023,825 being transparent to the base stations, those skilled in the art would not be led to combine the teachings of USPN 7,023,825 with the subject matter of R2-041294.

Thus, for at least the above reasons, it is submitted that the teachings of USPN 7,023,825 and R2-041294, taken alone or in combination, do not render obvious the subject matter of the present claims.

In accordance with the discussion provided above, the Applicants respectfully submit that allowance of new claims 79-119 is warranted.

Thus, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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